

### Remarks

The above Amendments and these Remarks are in reply to the Office Action mailed March 24, 2003.

Claims 1 - 29 and 94 were pending in the Application prior to the outstanding Office Action. In the Office Action, the Examiner withdrew claim 94 as being drawn to a non-elected invention. Thus, claims 1-29 remain in this application.

Applicants have amended the first paragraph of the specification to provided updated information on issued patents and abandoned applications.

#### I. Rejections Under 35 U.S.C. §102 Over Bonte

Claims 1-29 stand rejected under 35 U.S.C. §102(b) as anticipated by Bonte (WO 97/01345 ("Bonte")). The Examiner stated that Bonte, Example 7 "teaches a composition containing a polyacid, specifically hyaluronic acid and a divalent cation with an accompanying inorganic ion in the form of magnesium silicate. Bonte further teaches a polyalkylene oxide in the form of the copolymer methacryloyl ethyl betaine/methacrylate." Office Action, page 3.

Applicants' claim 1 is drawn to "a polyalkylene oxide. . ." According to the specification, "The term polyalkylene oxide ("PO") means non-ionic polymers comprising alkylene oxide monomers. Examples of polyalkylene oxides include polyethylene oxide (PEO), polypropylene oxide (PPO) and polyethylene glycol (PEG), or block copolymers comprising PO and/or PPO." Page 12, lines 25 - 28.

Applicants note that the term "alkylene oxide" is an oxide of an alkylene group, which according to standard nomenclature as cited in the McGraw Hill Dictionary of Scientific and Technical Terms, Fifth Edition, at page 64 refers to an unsaturated aliphatic group. Applicants herewith provide an Appendix containing relevant pages from the Dictionary for the Examiner's reference. Applicants also point out that an aliphatic group is "any organic compound of hydrogen and carbon characterized by a straight chain of the carbon atoms; three subgroups of such compounds are alkanes, alkenes, and alkynes." McGraw Hill Dictionary, page 63. Further, the term "oxide" is defined by the McGraw Hill Dictionary at page 1425 as a "[b]inary chemical compound in which oxygen is combined with a metal (such as Na<sub>2</sub>O; basic) or a nonmetal (such as NO<sub>2</sub>; acidic)."

Thus, Applicants submit that an "alkylene oxide" monomer is a binary group having an unsaturated aliphatic group combined to an oxygen atom. Further, a polyalkylene oxide is a polymer whose monomers are linked by ether bonds, such as R-O-R', where R and R' are hydrocarbon groups.

In contrast with the definition of "alkylene oxide" above, the term "methacrylate", according to common nomenclature is a salt form of methacrylic acid, which is defined by the McGraw Hill Dictionary at page 1254, as "CH<sub>2</sub>C(CH<sub>3</sub>)COOH...." Further, a methacrylic polymer is defined as "a polymer whose monomer is a methacrylic ester with the general formula H<sub>2</sub>=C(CH<sub>3</sub>)COOR." McGraw Hill Dictionary, page 1254; emphasis added.

Bonte teaches only methacrylate copolymers, and thus, teaches ester-linked polymers, and neither discloses nor teaches ether-linked polymers. Therefore, Applicants respectfully submit that Bonte cannot anticipate any of Applicants' claims because Bonte does not disclose all of the claimed elements. Thus, Applicants respectfully request the Examiner to reconsider the rejection and find the claims allowable over Bonte.

## II. Rejections Under 35 U.S.C. §103 Over Tapolsky and Jacob

The Claims stand rejected under 35 U.S.C. §103(a) as obvious over the combination of Tapolsky (U.S. Patent No: 5,800,832; "Tapolsky") and Jacob (U.S. Patent No: 5,985,312; "Jacob").

According to the Examiner, "Tapolsky teaches a polymeric composition comprising carboxypolysaccharides. . . and polyalkylene oxides. . . Tapolsky also teaches the addition of antithrombogenic agents. . . however, Tapolsky does not teach the addition of a multivalent/divalent cation." Office Action, page 4, second paragraph.

Furthermore, the Examiner stated: "Jacob teaches that the addition of multivalent metal compounds, i.e., Ca<sup>2+</sup>, Mg<sup>2+</sup>, Fe<sup>2+/3+</sup>, Al<sup>3+</sup> to polymer compositions containing polyacids and polyalkylene oxides improves the bioadhesive properties of these compositions (col. 5, line 57 - col 6, line 62) which adequately bridges the nexus between the prior art and the invention as claimed."

Applicants respectfully submit that Jacob does not teach the use of "multivalent cations", but rather discloses the use of "metal compounds." Applicants note that the term "metal compounds" as disclosed by Jacob refers mostly to "[m]etal compounds which enhance the bioadhesive properties of a polymer, preferably are water-insoluble metal compounds, such as water-insoluble metal oxides and hydroxides. . . ." Column 3, lines 47 - 49. Moreover, in many cases, the term "metal compound"

is used in the phrase "water-insoluble metal compounds" (col. 5, line 9), "metal compound . . . as a dispersion of a water-insoluble metal oxide" (col. 5, lines 24-25), "water insoluble metal compound" (col 4, lines 42-43). Additionally, "a water insoluble metal compound is defined as a metal compound with little or no solubility in water, for example, less than about 0.0 - 0.9 mg/ml." Col. 4, lines 43-46.

Additionally, according to the McGraw Hill Dictionary, page 425, a "compound" is defined as "[a] substance whose molecules consist of **unlike atoms** and whose constituents cannot be separated by physical means. Also known as a chemical compound." Emphasis added.

Therefore, Jacob's "metal compound" would, according to the above Dictionary definition, be made of unlike atoms. All of the examples of "metal compounds" disclosed in Jacob are made of unlike atoms, and includes metal oxides, metal hydroxides and the like. However, Applicants can find no disclosure of any "multivalent cation" in Jacob. At best, Jacob refers to "**partially ionized metal compounds**" (col 6, lines 41 - 42; emphasis added), but Applicants can find no teaching, disclosure or suggestion of a composition comprising a "multivalent cation."

Moreover, Jacob states as a purpose of the invention "to provide methods for improving the bioadhesive properties of polymeric drug delivery devices." "It is another object of the present invention to provide methods for improving the adhesion of drug delivery devices. . . to mucosal membranes. . ." "It is a further object of the invention to provide polymeric drug delivery devices with improved ability to bind to mucosal membranes. . ." Column 3, lines 27 - 38. In particular, Jacob states: "**enhanced binding of the polymers incorporating a metal compound is due to the presence of partially ionized metal compounds**, such as divalent or trivalent cations, on the surface of the polymer which interact, for example, via an ionic binding attraction with negatively charged glycosubstances such as sialic acid and L-fucose groups on the mucosal membrane surface. Multivalent ions such as divalent or trivalent cations in the metal compounds generally have the strongest affinity for the negatively-charged mucin chains." Column 6, lines 40-49; emphasis added. Applicants submit that the focus in Jacob is with the attraction between the polymers and tissues, where a "**partially ionized metal compound**" of a polymer would be bound with the tissue.

In contrast, Applicants' claim 1 is drawn to "[a]n ionically cross-linked gel, comprising: . . ." Thus, Jacob's disclosure pertains to methods for increasing the adhesion of polymers to tissues,

whereas Applicants' invention is directed to providing gels having desirable properties, including viscoelastic properties.

Applicants respectfully submit that Jacob's use of the term "metal compound" really refers to "insoluble metal compounds" and does not refer to "multivalent cation" as in Applicants claims. Applicants can find no teaching or suggestion in Tapolsky of the use of "a multivalent cation", and thus, Tapolsky cannot make up for the lack of such teaching or suggestion in Jacob. Because there is no teaching or suggestion in Jacob of the use of a "multivalent cation," Applicants submit that the combination of Jacob and Tapolsky together would not result in the Applicants' invention as claimed in claim 1. Because all of the other rejected claims depend directly or ultimately from claim 1, Applicants submit that none of the claims are rendered obvious by Tapolsky and Jacob, and urge the Examiner to reconsider the rejections and find the claims allowable.

### III. Conclusion

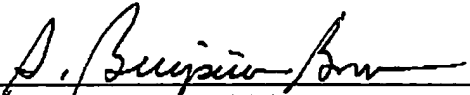
Applicants conclude from the above discussion that none of the cited prior art discloses (1) all the elements of the instant claims, or (2) when taken either separately or together teaches or suggests all elements of the claims. Thus, Applicants respectfully submit that (1) Bonte cannot anticipate the instant claims and (2) the combination of Tapolsky and Jacob, together or separately, cannot render the instant claims obvious to a person of ordinary skill without undue experimentation with a reasonable likelihood of success. Therefore, Applicants believe that no prima facie case for either anticipation nor obviousness has been made, and urge the Examiner to reconsider the rejections and find the claims allowable.

In light of the above, it is respectfully submitted that all of the claims now pending in the subject patent application should be allowable, and a Notice of Allowance is requested. The Examiner is respectfully requested to telephone the undersigned if he can assist in any way in expediting issuance of a patent.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 06-1325 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

Date: April 22, 2003

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**APPENDIX**

**Selected Pages from the McGraw Hill Dictionary of Scientific and Technical Terms,  
Fifth Edition**

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# **McGraw-Hill Dictionary of Scientific and Technical Terms**

## **Fifth Edition**

**Sybil P. Parker**  
Editor in Chief

**McGraw-Hill, Inc.**

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On the cover: Photomicrograph of crystals of vitamin B<sub>12</sub>.  
(Dennis Kunkel, University of Hawaii)

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In addition, material has been drawn from the following references: R. E. Huschke, *Glossary of Meteorology*, American Meteorological Society, 1959; U.S. Air Force *Glossary of Standardized Terms*, AF Manual 11-1, vol. 1, 1972; *Communications-Electronics Terminology*, AF Manual 11-1, vol. 3, 1970; W. H. Allen, ed., *Dictionary of Technical Terms for Aerospace Use*, 1st ed., National Aeronautics and Space Administration, 1965; J. M. Gilliland, *Solar-Terrestrial Physics: A Glossary of Terms and Abbreviations*, Royal Aircraft Establishment Technical Report 67158, 1967; *Glossary of Air Traffic Control Terms*, Federal Aviation Agency; *A Glossary of Range Terminology*, White Sands Missile Range, New Mexico, National Bureau of Standards, AD 467-424; *A DOD Glossary of Mapping, Charting and Geodetic Terms*, 1st ed., Department of Defense, 1967; P. W. Thrush, comp. and ed., *A Dictionary of Mining, Mineral, and Related Terms*, Bureau of Mines, 1968; *Nuclear Terms: A Glossary*, 2d ed., Atomic Energy Commission; F. Casey, ed., *Compilation of Terms in Information Sciences Technology*, Federal Council for Science and Technology, 1970; *Glossary of Siftro Terminology*, Office of Aerospace Research, U.S. Air Force, 1963; *Naval Dictionary of Electronic, Technical, and Imperative Terms*, Bureau of Naval Personnel, 1962; *ADP Glossary*, Department of the Navy, NAVSO P-3097.

# McGraw-Hill Dictionary of Scientific and Technical Terms, Fifth Edition

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## alignment chart

alkalimeter

63

direction of the route. [ELECTR] The process of adjusting components of a system for proper interrelationship, including the adjustment of tuned circuits for proper frequency response and the time synchronization of the components of a system. [ENG] Placing of surveying points along a straight line. [MAP] Representing of the correct direction, character, and relationships of a line or feature on a map. [MIN ENG] The act of laying out a tunnel or regulating by line; adjusting to a line. [NUC PHYS] A population  $p(m)$  of the  $2l + 1$  orientational substates of a nucleus;  $m = -l$  to  $+l$ , such that  $p(m) = p(-m)$ . [o'lin-mant]

alignment chart See nomograph. [o'lin-mant, chiirt]

alignment correction [ENG] A correction applied to the measured length of a line to allow for not holding the tape exactly in a vertical plane of the line. [o'lin-mant kə'rek-shən]

alignment pin [DAS ENG] Pin in the center of the base of an ocular, local, or other tube having a single vertical projecting rib that aids in correctly inserting the tube in its socket. [o'lin-mant pin]

alignment wire See ground wire. [o'lin-mant, wir]

alimentary [biol.] Of or relating to food, nutrition, or diet. [al'e;-men-trē]

alimentary canal [ANAT] The tube through which food passes; in humans, includes the mouth, pharynx, esophagus, stomach, and intestine. [al'e;-men-trē kə'nal]

alimentation [biol.] Providing nourishment by feeding. [al'e;-men-tā-shən]

Alloth [ASTRON] Traditional name for a second-magnitude star in the Big Dipper; the star  $\epsilon$  Ursae Majoris. [al'e;-lith]

aliphatic [ORG CHEM] Of or pertaining to any organic compound of hydrogen and carbon characterized by a straight chain of the carbon atoms; three subgroups of such compounds are alkanes, alkenes, and alkynes. [al'e;-fad-ik]

aliphatic acid [ORG CHEM] Any organic acid derived from aliphatic hydrocarbons. [al'e;-fad-ik 'as-əd]

aliphatic acid ester [ORG CHEM] Any organic ester derived from aliphatic acids. [al'e;-fad-ik 'as-əd 'es-tər]

aliphatic polycyclic hydrocarbon [ORG CHEM] A hydrocarbon compound in which at least two of the aliphatic structures are cyclic or closed. [al'e;-fad-ik 'pə-lē 'sī-klik 'hī-dro 'kār-bən]

aliphatic polyene compound [ORG CHEM] Any unsaturated aliphatic or alicyclic compound with more than four carbons in the chain and with at least two double bonds; for example, hexadiene. [al'e;-fad-ik 'pə-lē 'sī-klik 'hī-dro 'kār-bən]

aliphatic series [ORG CHEM] A series of open-chained carbon-hydrogen compounds; the two major classes are the series with saturated bonds and with the unsaturated. [al'e;-fad-ik 'sī-rēz]

aliquant [CHEM] A part of a sample that has been divided into a set of equal parts plus a smaller remainder part. [MATH] A divisor that does not divide a quantity into equal parts. [al'e;-kwant]

aliquot [CHEM] A part of a sample that has been divided into exactly equal parts with no remainder. [MATH] A divisor that divides a quantity into equal parts with no remainder. [MED] A representative sample of a larger quantity. [al'e;-kwat]

Alismataceae [BOT] A family of flowering plants belonging to the order Alismatales characterized by schizogenous secretory cells, a horseshoe-shaped embryo, and one or two ovules. [ə-liz-mə'te-ēz]

Alismatales [BOT] A small order of flowering plants in the subclass Alismatidae, including aquatic and semiaquatic herbs. [ə-liz-mə'te-ēz]

Alismatidae [BOT] A relatively primitive subclass of aquatic or semiaquatic herbaceous flowering plants in the class Liliopsida, generally having apocarpous flowers, and unilocular pollen and lacking endosperm. [ə-liz-mə'te-ēz]

alospheneid [ANAT] 1. The bone forming the greater wing of the sphenoid in adults. 2. Of or pertaining to the sphenoid wing. [al'e;-sfē-noid]

alite [MATER] A constituent of portland cement clinker consisting mostly of calcium silicate. [al'it]

alive [ELEC] See energized. [MIN ENG] That portion of a lode that is productive. [ə'liv]

axylleular [NUC ZOO] In some bivalves, having the long axis of the short ligament transverse to the hinge line. [al'e;-yiv-lyū-lər]

azobenzene [ORG CHEM]  $C_{12}H_{10}O_2$  An orange crystalline compound, insoluble in cold water, made synthetically from

anthraquinone; used in the manufacture of dyes and red pigments. [ə'liz-ə-tən]

alizarin dye [ORG CHEM] Sodium salts of sulfonic acids derived from alizarin. [ə'liz-ə-tən 'di]

alizarin red [ORG CHEM] Any of several red dyes derived from anthraquinone. [ə'liz-ə-tən 'red]

alizarin yellow [MATER] A dye useful as an acid-base indicator, solutions change color from yellow (acid) to purple (basic) in the pH range 10.1 to 12.0. [ə'liz-ə-tən 'yel-əd]

alkadiene See diene. [al'kə'di-ēn]

alkalemia [MED] An increase in blood pH above normal levels. [al'kə-'lēm-ē-ə]

alkalinescence [CHEM] The property of a substance that is alkaline, that is, having a pH greater than 7. [al'kə-'les-əns]

alkali [CHEM] Any compound having highly basic qualities. [al'kə-'li]

alkali aggregate reaction [CHEM] The chemical reaction of an aggregate with the alkali in a cement, resulting in a weakening of the concrete. [al'kə-'li 'ag-rē-gət rē'ak-shən]

alkali alcoholate [ORG CHEM] A compound formed from an alcohol and an alkali metal base; the alkali metal replaces the hydrogen in the hydroxyl group. [al'kə-'li 'al'kə-'hō-'lāt]

alkali blue [ORG CHEM] The sodium salt of triphenylmethanesulfonic acid; used as an indicator. [al'kə-'li 'blū]

alkali Also known as alkali. [PETR] 1. Of igneous rock, containing more than average alkali ( $K_2O$  and  $Na_2O$ ) for that class in which they are found. 2. Of igneous rock, having feldspathoids or other minerals, such as actinolite, so that the molecular ratio of alkali to silica is greater than 1:6. 3. Of igneous rock, having a low alkali-lime index (51 or less). [al'kə-'li]

alkali-calcic series [PETR] The series of igneous rocks with weight percentage of silica in the range 51-55, and weight percentages of  $CaO$  and  $K_2O + Na_2O$  equal. [al'kə-'li 'kal-'sīk 'sī-rēz]

alkali cellulose [MATER] Product of wood pulp steeped with sodium hydroxide; first step in manufacture of viscose rayon and other cellulose. [al'kə-'li 'sel-yū-'lōs]

alkali chlorosis [PL PATH] Yellowing of plant foliage due to excess amounts of soluble salts in the soil. [al'kə-'li 'klō-'rō-sis]

alkalide [INORG CHEM] A member of a class of crystalline salts with an alkali metal atom. [al'kə-'līd]

alkali denaturation test [PATH] A blood test for the measurement of fetal hemoglobin in terms of its resistance to alkali denaturation. [al'kə-'li 'de-nach-ə-'rā-shən 'test]

alkali disease [MED] Selenium poisoning. [VET MED] 1. Botulism of ducks. 2. Trembles of cattle. [al'kə-'li 'diz-ēz]

alkali emission [GEOPHYS] Light emission from free lithium, potassium, and especially sodium in the upper atmosphere. [al'kə-'li 'i-mī-shən]

alkali feldspar [MINERAL] A feldspar composed of potassium feldspar and sodium feldspar, such as orthoclase, microcline, albite, and anorthoclase; all are considered alkali-rich. [al'kə-'li 'feld-'spar]

alkali flat [GEOL] A level lakelike plain formed by the evaporation of water in a depression and deposition of its fine sediment and dissolved minerals. [al'kə-'li 'flat]

alkali ion diode [ZNO] In testing for leaks, a device which senses the presence of halogen gases by the use of positive ions of alkali metal on the heated diode surfaces. [al'kə-'li 'i-ōn 'di-ōd]

alkali lake [HYD] A lake with large quantities of dissolved sodium and potassium carbonates as well as sodium chloride. [al'kə-'li 'lāk]

alkali lead [MET] An alloy of lead hardened with small quantities of alkali metals; used as bearing metals. [al'kə-'li 'led]

alkali lignin [MATER] A type of lignin produced by treating the black liquor from the soda process with acid; used as an extender in the negative plates of storage batteries, in asphalt, and in paperboard products. [al'kə-'li 'lī-gnīn]

alkali-lime index [PETR] The percentage by weight of silica in a sequence of igneous rocks on a variation diagram where the weight percentages of  $CaO$  and of  $K_2O$  and  $Na_2O$  are equal. [al'kə-'li 'līm-'in-deks]

alkali metal [CHEM] Any of the elements of group I in the periodic table: lithium, sodium, potassium, rubidium, cesium, and francium. [al'kə-'li 'med-əl]

alkalimeter [ANALY CHEM] 1. An apparatus for measuring the quantity of alkali in a solid or liquid. 2. An apparatus for

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measuring the quantity of carbon dioxide formed in a reaction. [ 'al'ka'lim'et-er ]

**alkalimetry** [ANALY CHEM] Quantitative measurement of the concentration of bases or the quantity of one free base in a solution; techniques include titration and other analytical methods. [ 'al'ka'lim'et-er ]

**alkaline** [CHEM] 1. Having properties of an alkali. 2. Having a pH greater than 7. [ 'al'ka,lin ]

**alkaline cell** [ELEC] A primary cell that uses an alkaline electrolyte, usually potassium hydroxide, and delivers about 1.5 volts at much higher current rates than the common carbon-zinc cell. Also known as alkaline-manganese cell. [ 'al'ka,lin,sel ]

**alkaline cleaner** [MET] An aqueous solution of an alkali used for metal cleaning. [ 'al'ka,lin'kleen-er ]

**alkaline earth** [INORG CHEM] An oxide of an element of group II in the periodic table, such as barium, calcium, and strontium. Also known as alkaline-earth oxide. [ 'al'ka,lin'arth ]

**alkaline-earth metals** [CHEM] The heaviest members of group II in the periodic table; usually calcium, strontium, magnesium, and barium. [ 'al'ka,lin'arth'med-els ]

**alkaline-earth oxide** See alkaline earth. [ 'al'ka,lin'arth'ak,sid ]

**alkaline flooding** [PETRO ENG] A type of enhanced oil recovery in which alkaline chemicals are injected during a water flooding or are combined with polymer flooding; the chemicals react with acids in the crude oil to form surfactants. [ 'al'ka,lin'flood-ing ]

**alkaline-manganese cell** See alkaline cell. [ 'al'ka,lin'mang-ges,sel ]

**alkaline phosphatase** [BIOCHEM] A phosphatase active in alkaline media. [ 'al'ka,lin'fäs'fä,sis ]

**alkaline soil** [GEOL] Soil containing soluble salts of magnesium, sodium, or the like, and having a pH value between 7.3 and 8.5. [ 'al'ka,lin'soil ]

**alkaline storage battery** [ELEC] A storage battery in which the electrolyte consists of an alkaline solution, usually potassium hydroxide. [ 'al'ka,lin'stör-ij,bad-erē ]

**alkaline tide** [PHYSIO] The temporary decrease in acidity of urine and body fluids after eating, attributed by some to the withdrawal of acid from the body due to gastric digestion. [ 'al'ka,lin'tid ]

**alkaline wash** [CHEM ENG] The removal of impurities from kerosene, used for illuminating purposes, by caustic soda solution. [ 'al'ka,lin'wäsh ]

**alkalinity** [CHEM] The property of having excess hydroxide ions in solution. [ 'al'ka'lin'et-ē ]

**alkali reactivity** [MATER] Susceptibility of a concrete aggregate to alkali-aggregate reaction. [ 'al'ka,lin're-ak'tiv-etē ]

**alkali-resisting paint** [MATER] A paint, such as one made with a synthetic resin, that does not undergo saponification when used in such places as bathrooms or on such materials as new concretes. [ 'al'ka'lin're,zist-ing'pānt ]

**alkali soil** [GEOL] A soil, with salts injurious to plant life, having a pH value of 8.5 or higher. [ 'al'ka,lin'soil ]

**alkaloid** [ORG CHEM] One of a group of nitrogenous bases of plant origin, such as nicotine, cocaine, and morphine. [ 'al'ka,lōid ]

**alkalometry** [ANALY CHEM] The measurement of the quantity of alkaloids present in a substance. [ 'al'ka'lim'et-er ]

**alkalosis** [MED] A condition of high blood alkalinity caused either by high intake of sodium bicarbonate or by loss of hydrochloric acid or blood carbon dioxide. [ 'al'ka'lō-sis ]

**alkamines** [ORG CHEM] A compound that has both the alcohol and amino groups. Also known as amino alcohol. [ 'al'ka,mēn ]

**alkane** [ORG CHEM] A member of a series of saturated aliphatic hydrocarbons having the empirical formula  $C_nH_{2n+2}$ . Also known as paraffin; paraffinic hydrocarbon. [ 'al,kān ]

**alkanet** [MATER] A chemical indicator made from the root of *Alkanna tinctoria*. [ 'al'ka,nēt ]

**alkannin** [ORG CHEM]  $C_{16}H_{16}O_3$  A red powder, the coloring ingredient of alkanet; soluble in alcohol, benzene, ether, and oils; used as a coloring agent for fats and oils, wines, and wax. [ 'al'kanen ]

**alkanolamine** [ORG CHEM] One of a group of viscous, water-soluble amino alcohols of the aliphatic series. [ 'al'ka'nöl'ə,mēn ]

**alkaptonuria** [MED] A hereditary metabolic disorder trans-

mitted as an autosomal recessive in humans in which large amounts of homogentisic acid (alkapton) are excreted in the urine due to a deficiency of homogentisic acid oxidase. Also spelled alcaptonuria. [ 'al,kap'ta'nür-ə ]

**Alkar process** [CHEM ENG] Catalytic alkylation of aromatic hydrocarbons with olefins to produce alkylaromatics; for example, production of ethylbenzene from benzene and ethylene. [ 'al,kär'prüs-əs ]

**alkene** [ORG CHEM] One of a class of unsaturated aliphatic hydrocarbons containing one or more carbon-to-carbon double bonds. [ 'al,kēn ]

**alkoxide** See alcoholate. [ 'al'kāk,sid ]

**alkoxy** [ORG CHEM] An alkyl radical attached to a molecule by oxygen, such as the ethoxy radical. [ 'al'kāk-sē ]

**alkyd paint** [MATER] A paint using an alkyd resin as the vehicle for the pigment. [ 'al'kəd,pānt ]

**alkyd resin** [ORG CHEM] A class of adhesive resins made from unsaturated acids and glycerol. [ 'al'kəd'rez-in ]

**alkyl** [ORG CHEM] An organic group that results from removal of a hydrogen atom from an acyclic, saturated hydrocarbon; may be represented in a chemical formula by R—. [ 'al,kil ]

**alkylamine** [ORG CHEM] A compound consisting of an alkyl group attached to the nitrogen of an amine; an example is ethylamine,  $C_2H_5NH_2$ . [ 'al'käl'ä,mēn ]

**alkylaryl sulfonates** [ORG CHEM] General name for alkylbenzene sulfonates. [ 'al'käl'ä'räl'säl'fä,näts ]

**alkylate** [ORG CHEM] A product of the alkylation process in petroleum refining. [ 'al'käl,ät ]

**alkylate bottom** [CHEM ENG] Residue from fractionation of total alkylate which boils at a higher temperature than aviation gasoline. [ 'al'käl,ät'büt-əm ]

**alkylated gasoline** [MATER] A cleaning-burning gasoline with a high-octane rating; prepared by adding neohexane or some other alkylate. [ 'al'käl,äd-əd,gas-ö'lēn ]

**alkylation** [CHEM ENG] A refinery process for chemically combining isoparaffin with olefin hydrocarbons. [ORG CHEM] A chemical process in which an alkyl radical is introduced into an organic compound by substitution or addition. [ 'al'käl'it-āshn ]

**alkylbenzene sulfonates** [ORG CHEM] Widely used nonbiodegradable detergents, commonly dodecylbenzene or tridecylbenzene sulfonates. [ 'al'käl'ben,zēn'säl'fä,näts ]

**alkylene** [ORG CHEM] An organic radical formed from an unsaturated aliphatic hydrocarbon; for example, the ethylene radical  $C_2H_3$ —. [ 'al'käl,ēn ]

**alkyl halide** [ORG CHEM] A compound consisting of an alkyl group and a halogen; an example is ethylbromide. [ 'al'käl'häl'id ]

**alkylxonium ion** [ORG CHEM]  $(ROH)_3^+$  An oxonium ion containing one alkyl group. [ 'al'käl'äk'sō-nē-əm'ī-ōn ]

**alkyne** [ORG CHEM] One of a group of organic compounds containing a carbon-to-carbon triple bond. [ 'al,kīn ]

**allachesthesia** [MED] A tactile sensation experienced remote from the point of stimulation but on the same side of the body. [ 'al'äk-s'thēz-ē ]

**allactite** [MINERAL]  $Mn_2(AsO_4)_2(OH)_2$  Brownish-red mineral consisting of a basic manganese arsenate. [ 'äl'lak,tit ]

**allalinite** [PETR] An altered gabbro with original texture and euhedral pseudomorphs. [ 'äl'al-ē,nit ]

**allanite** [MINERAL]  $(Ca,Ce,La,Y)_2(Al,Fe)_3Si_3O_{12}(OH)$  Monoclinic mineral distinguished from all other members of the epidote group of silicates by a relatively high content of rare earths. Also known as bucklandite; cerine; orthite; treanorite. [ 'äl'ä,nit ]

**allantoic acid** [BIOCHEM]  $C_4H_6N_4O_6$  A crystalline acid obtained by hydrolysis of allantoin; intermediate product in nucleic acid metabolism. [ 'äl'än'tō'ik'ä-s-əd ]

**allantoin** [BIOCHEM]  $C_4H_6N_4O_3$  A crystallizable oxidation product of uric acid found in allantoic and amniotic fluids and in fetal urine. [ 'äl'än'tō'wän ]

**allantoinase** [BIOCHEM] An enzyme, occurring in nonmammalian vertebrates, that catalyzes the hydrolysis of allantoin. [ 'äl'än'tō'wä,näs ]

**allantols** [EMBRYO] A fluid-filled, saclike, extraembryonic membrane lying between the chorion and amnion of reptilian, bird, and mammalian embryos. [ 'äl'än'tō'wäs ]

**allantoxanic acid** [BIOCHEM]  $C_4H_3N_5O_6$  An acid formed by oxidation of uric acid or allantoin. [ 'äl'än,täk'sän'ik'ä-s-əd ]

## composite picture signal

in simultaneous exposure, into the equivalent of a photograph made with a wide-angle lens. [kam'pāz-ət 'fōd-ə,grəf]  
**composite picture signal** See composite color signal.  
 [kam'pāz-ət 'pik-cher,si-gnəl]  
**composite pile** [CIV ENG] A pile in which the upper and lower portions consist of different types of piles. [kam'pāz-ət 'pil]  
**composite plate** [MET] A layer of electrodeposited material consisting of at least two different constituents. [kam'pāz-ət 'plāt]  
**composite profile** [MAP] A profile comprising the highest points of a series of profiles that are drawn along several regularly spaced and parallel map lines. [kam'pāz-ət 'prō,fil]  
**composite propellant** See composite fuel. [kam'pāz-ət 'prɒp-əl-ənt]  
**composite pulse** [ELECTR] A pulse composed of a series of overlapping pulses received from the same source over several paths in a pulse navigation system. [kam'pāz-ət 'puls]  
**composite quantity** See composite number. [kam'pāz-ət 'kwānt-əd-ē]  
**composite sailing** [NAV] In marine operations, a modification of great-circle sailing, used when limiting the highest latitude. [kam'pāz-ət 'sā,liŋ]  
**composite sample** [ANALY CHEM] A sample comprising two or more increments selected to represent the material being analyzed. [kam'pāz-ət 'sāmp-əl]  
**composite sampler** [ENG] A hydrometer cylinder equipped with sample cocks at regular intervals along its vertical height, used to take representative (vertical composite) samples of oil from storage tanks. [kam'pāz-ət 'sāmp-ler]  
**composite sequence** [GEOL] An ideal sequence of cyclic sediments containing all the lithological types in their proper order. [kam'pāz-ət 'sē-kwāns]  
**composite set** [ELECTR] Assembly of apparatus designed to provide one end of a composite circuit. [kam'pāz-ət 'set]  
**composite sill** [GEOL] A sill consisting of several intrusions differing in chemical and mineralogical compositions. [kam'pāz-ət 'sil]  
**composite steel** [MET] Bar steel machined along the entire length which is cast around an insert of tool steel welded to the backing of mild steel; used for shear blades and die parts. [kam'pāz-ət 'stēl]  
**composite stream** [PETRO ENG] A flow of oil and gas, or a mixture of two or more different hydrocarbons in one stream. [kam'pāz-ət 'strīm]  
**composite topography** [GEOL] A topography whose features have developed in two or more erosion cycles. [kam'pāz-ət 'tɒp-ə-grə-fē]  
**composite track** [NAV] A modified great-circle track consisting of an initial great-circle track from the point of departure to a vertex on a limiting parallel of latitude; a parallel-sailing track from this vertex along the limiting parallel to the vertex of a final great-circle track passing through the destination. [kam'pāz-ət 'trak]  
**composite truss** [CIV ENG] A truss having compressive members and tension members. [kam'pāz-ət 'trʌs]  
**composite unconformity** [GEOL] An unconformity that has resulted from more than one episode of nondeposition and possible erosion. [kam'pāz-ət 'ʌn-kən-fɔrməd-ē]  
**composite vein** [GEOL] A large fracture zone composed of parallel (or filled) fissures and converging diagonals, whose walls and intervening country rock have been replaced to a partial degree. [kam'pāz-ət 'vān]  
**composite video signal** [COMMUN] The video-only portion of the standard color television signal used in the United States, in which red, green, and blue signals are mixed. [kam'pāz-ət 'vīd-ē-ō,si-gnəl]  
**composite volcano** See stratovolcano. [kam'pāz-ət 'vōl-'kā-nē]  
**composite wave filter** [ELECTR] A combination of two or more low-pass, high-pass, band-pass, or band-elimination filters. [kam'pāz-ət 'wāv,fil-tər]  
**composition** [CHEM] The elements or compounds making up a material or produced from it by analysis. [GRAPHS] The composing or combining type for printing, either by hand or machine. [MATH] 1. The composition of two mappings,  $g \circ f$ , denoted  $g \circ f$ , where the domain of  $g$  includes the range of  $f$ ; the mapping which assigns to each element  $x$  in the domain of  $f$  the element  $g(f(x))$ , where  $y = f(x)$ . 2. See addition.

## compound elastic scattering

425

[MECH] The determination of a force whose effect is the same as that of two or more given forces acting simultaneously; all forces are considered acting at the same point. [kām'pō-'zish-ən]  
**compositional maturity** [GEOL] Concept of a type of maturity in sedimentary rocks in which a sediment approaches the compositional end product to which formative processes drive it. [kām'pō-'zish-ən-əl mō-'chū-rəd-ē]  
**composition board** [MATER] A sheet product composed of vegetable fibers mechanically or chemically formed into a pulp which is rolled and pressed. Also known as compo board. [kām'pō-'zish-ən, bɔrd]  
**composition diagram** [CHEM ENG] Graphical plots to show the solvent-solute concentration relationships during various stages of extraction operations (leaching, or solid-liquid extraction; and liquid-liquid extraction). [kām'pō-'zish-ən, 'dī-ə,grām]  
**composition face** See composition surface. [kām'pō-'zish-ən, 'fēs]  
**composition metal** [MET] A cast copper alloy having a composition of more than 80% copper, with tin, zinc, and lead. [kām'pō-'zish-ən, med-əl]  
**composition-of-velocities law** [MECH] A law relating the velocities of an object in two reference frames which are moving relative to each other with a specified velocity. [kām'pō-'zish-ən əv 'və-lōs-əd-ēz, lɔ]  
**composition plane** [CRYSTAL] A planar composition surface in a crystal uniting two individuals of a contact twin. [kām'pō-'zish-ən, 'plān]  
**composition resistor** See carbon resistor. [kām'pō-'zish-ən rī-'zist-ər]  
**composition series** [MATH] A normal series  $G_1, G_2, \dots$  of a group, where each  $G_i$  is a proper normal subgroup of  $G_{i+1}$  and no further normal subgroups both contain  $G_i$  and are contained in  $G_{i+1}$ . [kām'pō-'zish-ən 'sīr-ēz]  
**composition surface** [CRYSTAL] The surface uniting individuals of a crystal twin; may or may not be planar. Also known as composition face. [kām'pō-'zish-ən, 'sɜrf-ēs]  
**compositum** [MATH] Let  $E$  and  $F$  be fields, both contained in some field  $L$ ; the compositum of  $E$  and  $F$ , denoted  $EF$ , is the smallest subfield of  $L$  containing  $E$  and  $F$ . [kam'pāz-əd-əm]  
**compost** [MATER] A mixture of decaying organic matter used to fertilize and condition the soil. [kām, pɒst]  
**compound** [CHEM] A substance whose molecules consist of unlike atoms and whose constituents cannot be separated by physical means. Also known as chemical compound. [PETRO ENG] A power transmission mechanism that transfers power from the engines to the pump, drawworks, and other machinery on a drilling rig. [kām, paʊnd]  
**compound acinous gland** [ANAT] A structure with spherical secreting units connected to many ducts that empty into a common duct. [kām, paʊnd 'as-ə-nəs, gland]  
**compound alluvial fan** [GEOL] Structure formed by the lateral growth and merger of fans made by neighboring streams. [kām, paʊnd ə-lī-vē-əl 'fan]  
**compound angle** [ENG] The angle formed by two mitered angles. [kām, paʊnd 'æŋ-gəl]  
**compound compact** [MET] A powder compact made from a mixture of metals, with each particle retaining its original composition. [kām, paʊnd 'kām, pakt]  
**compound cryostat** [ELECTR] A cryostat consisting of two normal cryostats with different electrical characteristics in series. [kām, paʊnd 'krī-ō, sār]  
**compound curve** [MATH] A curve made up of two arcs of differing radii whose centers are on the same side, connected by a common tangent; used to lay out railroad curves because curvature goes from nothing to a maximum gradually, and vice versa. [kām, paʊnd 'kɜrv]  
**compound die** [MET] A die designed to perform more than one operation on the work with each stroke of the press. [kām, paʊnd 'di]  
**compound distribution** [STAT] A frequency distribution resulting from the combining of two or more separate distributions of the same general type. [kām, paʊnd, dī-strī-'byū-shən]  
**compound elastic scattering** [NUC PHYS] Scattering in which the final state is the same as the initial state, but there is an intermediate state with the colliding systems amalgamating to form a compound system. [kām, paʊnd 'lās-dīk 'sked-ər-ɪŋ]

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# meteorological rocket

## methacrylate ester

1253

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Also known as standard visibility; standard visual. ( 'mēd-ē-ōr-ā-lā-jō-kal 'rād )

**meteorological rocket** [ENG] Small rocket system used to preserve atmospheric character above feasible limit; balloon-borne observing and telemetering instruments. Also known as rocketsonde. ( 'mēd-ē-ōr-ā-lā-jō-kal 'rā-kēt )

**meteorological satellite** [AERO ENG] Earth-orbiting spacecraft carrying a variety of instruments for measuring visible and infrared radiations from the earth and its atmosphere. ( 'mēd-ē-ōr-ā-lā-jō-kal 'sād-ē-l-ī )

**meteorological solenoid** [METEOROL] A hypothetical tube in space by the intersection of a set of surfaces of constant pressure and a set of surfaces of constant specific volume. Also known as solenoid. ( 'mēd-ē-ōr-ā-lā-jō-kal 'sō-lē-nōid )

**meteorological tide** [OCEANOGR] A change in water level by local meteorological conditions, in contrast to an astronomical tide, caused by the attractions of the sun and moon. ( 'mēd-ē-ōr-ā-lā-jō-kal 'tīd )

**meteorology** [SCI TECH] The science concerned with the atmosphere and its phenomena; the meteorologist observes the atmosphere's temperature, density, winds, clouds, precipitation, and other characteristics and aims to account for its observed changes and evolution (weather, in part) in terms of external forces and the basic laws of physics. ( 'mēd-ē-ō-r-ē-lō-j-ē )

**meteor shower** [ASTRON] A number of meteors with approximately parallel trajectories. ( 'mēd-ē-ōr, 'shā-ōr )

**meteor stream** [ASTRON] A group of meteoric bodies with identical orbits. ( 'mēd-ē-ōr, 'strēm )

**meter** See ion column. ( 'mēd-ē-ōr, 'trīl )

**meter** [METR] The international standard unit of length, equal to the length of the path traveled by light in vacuum during a time interval of  $1/299,792,458$  of a second. Abbreviated m. ( 'mēd-ē-ōr )

**meter** A device for measuring the value of a quantity under observation; the term is usually applied to an indicating instrument. ( 'mēd-ē-ōr )

**meter-ampere** [COMMON] Measure of the strength of a radio transmitting station. ( 'mēd-ē-ōr 'am-pīr )

**meter-atmosphere** [PHYS] The depth of an equivalent atmosphere of a given gas, in meter-atmospheres, is equal to the number of meters that the atmosphere would have if it were composed entirely of the gas in question and in the same amount as the actual atmosphere, and had a uniform temperature of  $0^{\circ}\text{C}$  and 1 standard atmosphere. Abbreviated m-atm. Also known as atmo-meter. ( 'mēd-ē-ōr 'arm-ē-sfīr )

**meter bar** [ENG] A metal bar for mounting a gas meter, having the ends for the inlet and outlet connections of the meter. ( 'mēd-ē-ōr, 'bār )

**meter bridge** [ELEC] A uniform resistance wire 1 meter in length mounted above a scale marked in millimeters, with terminals added to make the device usable as either part of a Wheatstone bridge or of a potentiometer. ( 'mēd-ē-ōr, 'brīj )

**meter candle** See lux. ( 'mēd-ē-ōr 'kan-dəl )

**meter density** [ENG] In an energy distribution system, the number of meters per unit area or per unit length. ( 'mēd-ē-ōr, 'dēns-ē-ē )

**meter factor** [ENG] A factor used with a meter to correct for conditions, for example, the factor for a fluid-flow meter to compensate for such conditions as liquid temperature change and pressure shrinkage. ( 'mēd-ē-ōr, 'fākt-ōr )

**meter installation** [PETRO ENG] Oil-production receiving installation that includes with the tank battery a metering separator, a gas treater, or other type of meter used in conjunction with separators or emulsion breakers. ( 'mēd-ē-ōr-ēn, 'īn-stāl-lā-shēn )

**meter pin** See metering rod. ( 'mēd-ē-ōr-ēn, 'pīn )

**meter pump** [CHEM ENG] Plunger-type pump designed to accurately small-scale fluid-flow rates; used to inject small quantities of materials into continuous-flow liquid streams. Also known as proportioning pump. ( 'mēd-ē-ōr-ēn, 'pūmp )

**meter rod** [ENG] A device consisting of a long metallic graduated diameters fitted to the main nozzle of a carburetor on an internal combustion engine or passage leading to a fuel tank in such a way that it measures or meters the amount of fuel permitted to flow by it at various speeds. Also known as metering pin. ( 'mēd-ē-ōr-ēn, 'rād )

**meter screw** [MECH ENG] An extrusion-type screw feeder

or conveyor section used to feed pulverized or doughy material at a constant rate. ( 'mēd-ē-ōr-ēn, 'skrū )

**metering separator** [PETRO ENG] Oil-field process vessel that performs the dual functions of gas-oil separation and liquids metering. ( 'mēd-ē-ōr-ēn, 'sep-ə-rād-ōr )

**metering tank** See measuring tank. ( 'mēd-ē-ōr-ēn, 'tānk )

**metering valve** [MECH ENG] In an automotive hydraulic braking system, a valve that momentarily delays application of the front disk brakes until the rear drum brakes begin to act. ( 'mēd-ē-ōr-ēn, 'vālv )

**meter-kilogram** [MECH] 1. A unit of energy or work in a meter-kilogram-second gravitational system, equal to the work done by a kilogram-force when the point at which the force is applied is displaced 1 meter in the direction of the force; equal to 9.80665 joules. Abbreviated m-kgf. Also known as meter kilogram-force. 2. A unit of torque, equal to the torque produced by a kilogram-force acting at a perpendicular distance of 1 meter from the axis of rotation. Also known as kilogram-meter (kgf-m). ( 'mēd-ē-ōr 'kil-ō, 'gram )

**meter kilogram-force** See meter-kilogram. ( 'mēd-ē-ōr 'kil-ō, 'gram 'fōrs )

**meter-kilogram-second-ampere system** [PHYS] A system of electrical and mechanical units in which length, mass, time, and electric current are the fundamental quantities, and the units of these quantities are the meter, the kilogram, the second, and the ampere respectively. Abbreviated mksa system. Also known as Giorgi system; practical system. ( 'mēd-ē-ōr 'kil-ō, 'gram 'sek-ənd 'am-pīr, 'sīst-əm )

**meter-kilogram-second system** [MECH] A metric system of units in which length, mass, and time are fundamental quantities, and the units of these quantities are the meter, the kilogram, and the second respectively. Abbreviated mks system. ( 'mēd-ē-ōr 'kil-ō, 'gram 'sek-ənd, 'sīst-əm )

**meter oil** [MATER] High-purity grade of oil used to lubricate the moving elements of meters. ( 'mēd-ē-ōr, 'ōil )

**meter prover** [ENG] A device that determines the accuracy of a gas meter; a quantity of air is collected over water or oil in a calibrated cylindrical bell, and then the bell is allowed to sink into the liquid, forcing the air through the meter; the calibrated measurement is then compared with the reading on the meter dial. ( 'mēd-ē-ōr, 'prū-ōr )

**meter-proving tank** See calibrating tank. ( 'mēd-ē-ōr, 'prū-ōr, 'tānk )

**meter run** [ENG] The length of straight, unobstructed fluid-flow conduit preceding an orifice or venturi meter. ( 'mēd-ē-ōr, 'rən )

**meter sensitivity** [ENG] The accuracy with which a meter can measure a voltage, current, resistance, or other quantity. ( 'mēd-ē-ōr, 'sen-sē-tīv-ē-ē )

**meter sizing factor** [FL MECH] A dimensionless number used in calculating the rate of flow of fluid through a pipe from the readings of a flowmeter that measures the drop in pressure when the fluid is forced to flow through a circular orifice; it is equal to  $K(d/D)^2$ , where  $K$  is the flow coefficient,  $d$  is the orifice bore diameter, and  $D$  is the internal diameter of the pipe. ( 'mēd-ē-ōr 'sīz-ēn, 'fākt-ōr )

**meter stop** [MECH ENG] A valve installed in a water service pipe for control of the flow of water to a building. ( 'mēd-ē-ōr, 'stōp )

**meter-ton-second system** [MECH] A modification of the meter-kilogram-second system in which the metric ton (1000 kilograms) replaces the kilogram as the unit of mass. ( 'mēd-ē-ōr 'tən 'sek-ənd, 'sīst-əm )

**meter-type relay** [ELEC] A relay that uses a meter movement having a contact-bearing pointer which moves toward or away from a fixed contact mounted on the meter scale. ( 'mēd-ē-ōr, 'rē-lā )

**meter wheel** [ENG] A special block used to support the oceanographic wire paid out over the side of a ship; attached directly or connected by means of a speedometer cable to a gearbox which measures the length of wire. ( 'mēd-ē-ōr, 'wēl )

**metestrus** [PHYSIO] The beginning of the luteal phase following estrus. ( 'mēd-ē-s-trūs )

**methacrolein** [ORG CHEM]  $\text{CH}_2\text{C}(\text{CH}_3)\text{CHO}$  Liquid with  $68^{\circ}\text{C}$  boiling point; slightly soluble in water; used to make resins and copolymers. ( 'mē-thāk-rō-lēn )

**methacrylate ester** [ORG CHEM]  $\text{CH}_2\text{C}(\text{CH}_3)\text{COOR}$  Methacrylic acid ester in which R can be methyl, ethyl, isobutyl, or

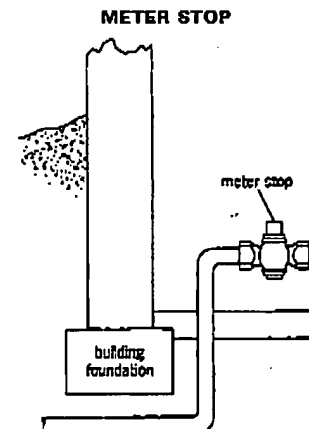


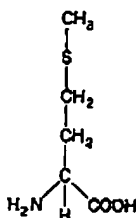
Diagram of a meter stop on a water service pipe.

## 1254 | methacrylic acid

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methoxide

## METHIONINE



Structural formula of methionine.

50-50 *n*-butyl-isobutyl groups; used to make thermoplastic polymers or copolymers. (meth'akrē,ilē 'es-tar)  
**methacrylic acid** [ORG CHEM]  $\text{CH}_2\text{C}(\text{CH}_3)\text{COOH}$  Easily polymerized, colorless liquid melting at 15-16°C; soluble in water and most organic solvents; used to make water-soluble polymers and as a chemical intermediate. (meth'ə,kri'k 'as-əd)

**methacrylic polymer** [ORG CHEM] A polymer whose monomer is a methacrylic ester with the general formula  $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{COOR}$ . (meth'ə,kri'k 'pāl-ə-mar)  
**methacrylonitrile** [ORG CHEM]  $\text{CH}_2\text{C}(\text{CH}_3)\text{CN}$  Clear, colorless liquid boiling at 90°C; used to make solvent-resistant thermoplastic polymers and copolymers. (meth'ə-kro'lin-ə,tri)

**methadone** [PHARM]  $\text{C}_{11}\text{H}_{17}\text{NO}$  The compound 6-(dimethylamino)-4,4-diphenyl-3-heptanone, a narcotic analgesic, administered in the hydrochloride form for maintenance treatment of heroin addiction. (meth'ə,dān)

**methallyl alcohol** [ORG CHEM]  $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CH}_2\text{OH}$  Flammable, toxic, water-soluble, colorless liquid boiling at 115°C; has pungent aroma; soluble in most organic solvents; used as a chemical intermediate. Also spelled methyl allyl alcohol. (meth'al'al 'al-kə,hōl)

**methanal** See formaldehyde. (meth'ə,nal)

**methanamide** See formamide. (meth'ə-nā-mid)

**methane** [ORG CHEM]  $\text{CH}_4$  A colorless, odorless, and tasteless gas, lighter than air and reacting violently with chlorine and bromine in sunlight, a chief component of natural gas; used as a source of methanol, acetylene, and carbon monoxide. Also known as methyl hydride. (meth,ān)

**methanearsonic acid** [ORG CHEM]  $\text{CH}_3\text{AsO}(\text{OH})_2$  A white solid with a melting point of 161°C; very soluble in water; used as an herbicide for cotton crops and for noncrop areas. Abbreviated MAA. (meth,ān'ār'sān'ik 'as-əd)

**methane drainage** See firedamp drainage. (meth,ān ,drān-ij)

**methane hydrate** [CHEM] Methane gas trapped or dissolved in ice formed in deep-sea sediments. (meth,ān 'hi,drāt)

**methane indicator** [MIN ENG] A portable analytical instrument that can determine the methane content in the mine air at the place where the sample is taken; air is brought into the instrument through an aspirator bulb and passed through a cartridge filter to remove moisture. (meth,ān ,ind-ə,kād-er)

**methane monitoring system** [MIN ENG] A system that samples methane content in mine air continuously and feeds this information into an electrical device that cuts off power in each mining machine when the methane content rises above a predetermined level. (meth,ān 'mōn-ə-trij ,sist-əm)

**methane-oxidizing bacteria** [MICROBIO] Bacteria that derive energy from oxidation of methane. (meth,ān 'āks-ə,dīz-ij bak'tē-ə)

**methanesulfonic acid** [ORG CHEM]  $\text{CH}_3\text{SO}_3\text{H}$  A solid with a melting point of 20°C; used as a catalyst in polymerization, esterification, and alkylation reactions, and as a solvent. Also known as methanesulfonic acid. (meth,ān'səl'fōn'ik 'as-əd)

**Methanobacteriaceae** [MICROBIO] The single family of methane-producing bacteria; anaerobes which obtain energy via formation of methane. (meth'ə-nō,bak'tē-ē'sē,ē)

**methanogen** [BIOL] An organism carrying out methanogenesis, requiring completely anaerobic conditions for growth; considered by some authorities to be distinct from bacteria. (mə'thān-ə-jən)

**methanogenesis** [BIOCHEM] The biosynthesis of the hydrocarbon methane; common in certain bacteria. Also known as bacterial methanogenesis. (meth'ə-nō'jen-ə-səs)

**methanol acid** See formic acid. (meth'ə-nō'k 'as-əd)

**methanol** See methyl alcohol. (meth'ə,nōl)

**Methanomicrobiota** [MICROBIO] Formerly a family of bacteria in the suborder Pseudomonadineae; members identified as gram-negative rods are able to use carbon monoxide (*Carboxydomonas*), methane (*Methanomonas*), and hydrogen (*Hydrogenomonas*) as their sole source of energy for growth. (meth'ə-nō,mān-ə'dīz-ē,ē)

**methamorphosis** [GEOL] Changes that occur in a buried sediment after uplift or consolidation but before the onset of weathering. Also spelled metamorphosis. (mə'thām-ə'səs)

**methemoglobin** See ferrihemoglobin. (met,hē-mə'glō-ben)

**methemoglobinemia** [MED] The presence of methemoglobin in the blood. (met,hē-mə'glō-bē'nē-mē-ə)

**methemoglobinuria** [MED] The presence of methemoglobin in the urine. (met,hē-mə'glō-bē'nī-ūr-ē-ə)

**methenyl** See methine group. (meth'ə,nil)

**methidathion** [ORG CHEM]  $\text{C}_8\text{H}_{11}\text{O}_2\text{N}_2\text{PS}_2$  A colorless, crystalline compound with a melting point of 39-40°C; used as an insecticide and miticide for pests on alfalfa, citrus, and cotton. (mə'thid-ə'thi,ān)

**methide** [ORG CHEM] A binary compound consisting of methyl and, most commonly, a metal, such as sodium (sodium methide,  $\text{NaCH}_3$ ). (meth'id)

**methine group** [ORG CHEM]  $\text{HC}\equiv$  A radical consisting of a single carbon and a single hydrogen. Also known as methenyl; methyldyne. (meth'ēn,then 'grīp)

**methionic acid** [ORG CHEM]  $\text{CH}_3(\text{SO}_3\text{H})_2$  An acid that exists as hygroscopic crystals; used in organic synthesis. (meth'ē;n'ik 'as-əd)

**methionine** [BIOCHEM]  $\text{C}_5\text{H}_{11}\text{O}_2\text{NS}$  An essential amino acid; furnishes both labile methyl groups and sulfur necessary for normal metabolism. (mə'thi-ə,nēn)

**method of bisectors** [NAV] As applied to celestial lines of position, the movement of each of three or four intersecting lines of position in equal amounts, in the same direction, toward or away from the celestial bodies, so as to bring them as nearly as possible to a common intersection; when there are more than four lines of position, the lines of position in the same general direction are combined to reduce the data to not more than four lines of position. (meth'əd əv 'bi,sek-tarz)

**method of images** [ELEC] In electrostatics, a method of determining the electric fields and potentials set up by charges in the vicinity of a conductor, in which the conductor and its induced surface charges are replaced by one or more fictitious charges. [PETRO ENG] Method of calculating the interference between reservoirs by assuming a mirror image of one reservoir on the far side of a geologic fault. [PHYS] Any method of solving magnetostatic, hydrodynamic, and other problems involving boundary conditions at the interface between two media, in which fictitious objects, such as magnetic dipoles and sources and sinks of fluid, are introduced to satisfy the boundary conditions; these methods are generalizations of the method in electrostatics. (meth'əd əv 'im-ij-əz)

**method of joints** [ENG] Determination of stresses for joints at which there are not more than two unknown forces by the methods of the stress polygon, resolution, or moments. (meth'əd əv 'jōins)

**method of mixtures** [THERMO] A method of determining the heat of fusion of a substance whose specific heat is known, in which a known amount of the solid is combined with a known amount of the liquid in a calorimeter, and the decrease in the liquid temperature during melting of the solid is measured. (meth'əd əv 'miks-chərz)

**method of moments** [STAT] A method of estimating the parameters of a frequency distribution by first computing as many moments of the distribution as there are parameters to be estimated and then using a function that relates the parameters to moments. (meth'əd əv 'mō-mēnts)

**method of moving averages** [STAT] A series of averages where each average is the mean value of the time series over a fixed interval of time, and where all possible averages of the length are included in the analysis; used to smooth data in a time series. (meth'əd əv 'mūv-ij 'av-rīj-əz)

**method of semiaverages** [STAT] A method for providing a quick estimate of a linear regression line, in which data are divided into two equal sets and the means of the two sets or two other points representative of each set are determined and a straight line drawn through them. (meth'əd əv 'sem-ē,av-rīj-əz)

**methods design** [IND ENG] Design for a new, more efficient method of job performance. (meth'əd-z dī,zīn)

**methods engineering** [IND ENG] A technique used by management to improve working methods and reduce labor costs in all areas where human effort is required. (meth'əd-z ,en-jə'nī-ij)

**methods study** [IND ENG] An analysis of the methods in use, of the means and potentials for their improvement, and of reducing costs. (meth'əd-z ,stād-ē)

**methotrexate** See amethopterin. (meth'ə'trēk,sāt)

**methoxide** [ORG CHEM] A compound formed from a metal

## oxidative phosphorylation

to elemental form. Also known as oxidation number. ( 'āks-sā-shān, sūi )

**oxidative phosphorylation** [BIOCHEM] Conversion of inorganic phosphate to the energy-rich phosphate of adenosinetriphosphate by reactions associated with the electron transfer system. ( 'āks-sā, dā-dīv, fā-fō-tā 'lā-shān )

**oxide** [CHEM] Binary chemical compound in which oxygen is combined with a metal (such as  $\text{Na}_2\text{O}$ ; basic) or nonmetal (such as  $\text{NO}_2$ ; acidic). ( 'āks-sīd )

**oxide-coated cathode** [ELECTR] A cathode that has been coated with oxides of alkaline-earth metals to improve electron emission at moderate temperatures. Also known as Wehnelt cathode. ( 'āks-sīd, kōd-ād 'kath, ōd )

**oxide fuel reactor** [NUCLEO] A nuclear fission reactor with fuel in the form  $\text{UO}_2$  or  $\text{PuO}_2$ . ( 'āks-sīd 'fū-īl rē-ākt-er )

**oxide isolation** [ELECTR] Isolation of the elements of an integrated circuit by forming a layer of silicon oxide around each element. ( 'āks-sīd, fā-sā 'lā-shān )

**oxide mineral** [MINERAL] A naturally occurring material in oxide form such as silicon dioxide,  $\text{SiO}_2$ , magnetite,  $\text{Fe}_3\text{O}_4$ , or lime,  $\text{CaO}$ . ( 'āks-sīd 'mīn-er-ēl )

**oxide nuclear fuel** [NUCLEO] The fissionable nuclear fuel  $\text{UO}_2$  or  $\text{PuO}_2$ . ( 'āks-sīd 'nū-klē-er 'fū-īl )

**oxide passivation** [ELECTR] Passivation of a semiconductor surface by producing a layer of an insulating oxide on the surface. ( 'āks-sīd, pas-sā-vā-shān )

**oxidite** See shale ball. ( 'āks-sīd, ōi )

**oxidized cellulose** See oxycellulose. ( 'āks-sā, dīz 'sel-yō, lōs )

**oxidized microcrystalline wax** [MATER] Refined, oxidized wax from bottoms of storage tanks for solvent-extracted petroleum; used in floor polishes. ( 'āks-sā, dīz 'mī-kro, kristol-ēn 'waks )

**oxidized shale** See burnt shale. ( 'āks-sā, dīz 'shāl )

**oxidized zone** [GEOL] A region of mineral deposits which has been altered by oxidizing surface waters. ( 'āks-sā, dīz 'zōn )

**oxidizer** [AERO ENG] A substance, not necessarily containing oxygen, that supports the combustion of a fuel or propellant. ( 'āks-sā, dīz-er )

**oxidizing agent** [CHEM] Compound that gives up oxygen easily, removes hydrogen from another compound, or attracts negative electrons. Also known as oxidant. ( 'āks-sā, dīz-īng 'ā-jent )

**oxidizing atmosphere** [CHEM] Gaseous atmosphere in which an oxidation reaction occurs; usually refers to the oxidation of solids. ( 'āks-sā, dīz-īng 'at-mō-sfēr )

**oxidizing flame** [CHEM] A flame, or the portion of it, that contains an excess of oxygen. ( 'āks-sā, dīz-īng 'flām )

**oxidoreductase** [BIOCHEM] An enzyme catalyzing a reaction in which two molecules of a compound interact so that one molecule is oxidized and the other reduced, with a molecule of water entering the reaction. ( 'āks-sā, dī-er 'dākt, ās )

**oxime** [ORG CHEM] Compound containing the  $\text{CH}(\text{NOH})$  radical; condensation product of hydroxylamine with aldehydes or ketones. ( 'āks-sē-m )

**oximeter** [MED] A photoelectric photometer used to measure the oxygenated fraction of the hemoglobin in blood which is either circulating in a particular tissue of an intact animal or human being, or during, or shortly after, its withdrawal from the vascular system, by observation of the absorption of light transmitted through or reflected from the blood. ( 'āks-sī-m-ē-tēr )

**oximetry** [PHYSIO] Optical measurement of the degree of oxygen saturation of the blood hemoglobin by determining the variation in the color of the blood. ( 'āks-sī-m-ē-t-rē )

**oximido** See nitroso. ( 'āks-sī-m-ē-dō )

**oxine** [ORG CHEM]  $\text{C}_8\text{H}_7\text{NO}$  White powder that darkens when exposed to light; slightly soluble in water, dissolves in ethanol, acetone, and benzene; used to prepare fungicides and to separate metals by precipitation. Also known as 8-hydroxyquinoline; oxyquinoline; 8-quinolinol. ( 'āks-sēn )

**oxirane** See epoxide; ethylene oxide. ( 'āks-sē-rān )

**Oxisol** [GEOL] A soil order characterized by residual accumulations of inactive clays, free oxides, kaolin, and quartz; mostly tropical. ( 'āks-sō, sol )

**oxo-** [ORG CHEM] Chemical prefix designating the keto group,  $\text{C}=\text{O}$ . ( 'āks-ō )

**oxoferrite** [GEOL] A variety of naturally occurring iron with some ferrous oxide in solid solution. ( 'āks-sē 'fē, rīt )

**para-oxon** [ORG CHEM]  $(\text{C}_2\text{H}_5)_2\text{P}(\text{O})\text{C}_6\text{H}_4\text{NO}_2$  A reddish-

yellow oil with a boiling point of 148–151°C; soluble in most organic solvents; used as an insecticide. Also known as diethyl para-nitrophenyl phosphate. ( 'pār-ē 'āks-sān )

**oxonium ion** [CHEM]  $\text{R}_3\text{O}^+$  A cation in which an oxygen atom is covalently bound to three atoms or groups of atoms. ( 'āks-sē-nē-ōm 'ī-ān )

**oxo process** [CHEM ENG] Catalytic process for production of alcohols, aldehydes, and other oxygenated organic compounds by reaction of olefin vapors with carbon monoxide and hydrogen. ( 'āks-ō, prō-sēs )

**oxosilane** See siloxane. ( 'āks-ō 'sī, lān )

**oxoxanthone** See genicide. ( 'āks-ō 'zān, thōn )

**oxycanthine** [ORG CHEM]  $\text{C}_{17}\text{H}_{19}\text{N}_2\text{O}_6$  An alkaloid obtained from the root of *Berberis vulgaris*; a white, crystalline powder with a melting point of 202–214°C; soluble in water, chloroform, benzene, alcohol, and ether; used in medicine. Also known as vinetane. ( 'āks-sē-ē 'kan, thēn )

**oxycetylene cutting** [ENG] The flame cutting of ferrous metals in which the preheating of the metal is accomplished with a flame produced by an oxycetylene torch. Also known as acetylene cutting. ( 'āks-sē-ē 'sed-ēl, ēn 'kēd-īng )

**oxycetylene torch** [ENG] A torch that mixes acetylene and oxygen to produce a hot flame for the welding or cutting of metal. Also known as acetylene torch. ( 'āks-sē-ē 'sed-ēl, ēn 'tōrch )

**oxycetylene welding** [MET] A welding process in which the heat is supplied by an oxycetylene torch. Also known as acetylene welding. ( 'āks-sē-ē 'sed-ēl, ēn 'weld-īng )

**Oxyaenidae** [PALAEON] An extinct family of mammals in the order Deltatheridae; members were short-faced carnivores with powerful jaws. ( 'āks-sē-ē-nā, dē )

**oxyamination** See ammoxidation. ( 'āks-sē, am-ē-nā-shān )

**oxybenzone** [ORG CHEM]  $\text{C}_{12}\text{H}_{12}\text{O}_3$  A crystalline substance with a melting point of 66°C; used as a sunscreen agent. Also known as 4-methoxy-2-hydroxybenzophenone. ( 'āks-sē 'ben, zōn )

**oxybiotite** [MINERAL] Phenocrystic biotite with increased amounts of Fe(III). ( 'āks-sē 'bī-ōt, īl )

**oxycarboxin** [ORG CHEM]  $\text{C}_{12}\text{H}_{13}\text{NO}_5$  An off-white, crystalline compound with a melting point of 127.5–130°C; used to control rust disease in greenhouse carnations. Also known as 5,6-dihydro-2-methyl-1,4-oxathia-3-carboxanilide-4,4-dioxide. ( 'āks-sē 'kār-bāks-sān )

**oxycellulose** [MATER] Cellulose mixed with reaction products from oxidation of cellulose in the presence of steam or alkalies or by strong sunlight. Also known as oxidized cellulose. ( 'āks-sē 'sel-yō, lōs )

**oxycephaly** [MED] A condition in which the head assumes a roughly conical shape due to premature closure of the coronal or lambdoid sutures, or to artificial pressure on the frontal and occipital regions of the infant's head. Also known as acrocephaly. ( 'āks-sē 'sēf-ē-lē )

**oxychloride cement** [MATER] A strong, hard cement composed of magnesium chloride and calcined magnesite; used for floors and stucco. Also known as Sorel cement. ( 'āks-sē 'klōr, īd sī 'ment )

**oxy compound** [CHEM] A compound containing two or more oxygen atoms that are not joined to each other but are covalently bound to other atoms in the structure. ( 'āks-sē, kām, pōnd )

**oxygen** [CHEM] A gaseous chemical element, symbol O, atomic number 8, and atomic weight 15.9994; an essential element in cellular respiration and in combustion processes; the most abundant element in the earth's crust, and about 20% of the air by volume. ( 'āks-sē-jen )

**oxygen-18** [NUC PHYS] Oxygen isotope with atomic weight 18; found 8 parts to 10,000 of oxygen-16 in water, air, and rocks; used in tracer experiments. Also known as heavy oxygen. ( 'āks-sē-jen 'ā-tēn )

**oxygen absorbent** [CHEM] Any material that will absorb (dissolve) oxygen into its body without reacting with it. ( 'āks-sē-jen ab-sōrb-ēnt )

**oxygenase** [BIOCHEM] An oxidoreductase that catalyzes the direct incorporation of oxygen into its substrate. ( 'āks-sē-jō, ās )

**oxygenate** [CHEM] To treat, infuse, or combine with oxygen. [MATER] An oxygen-containing compound, such as an alcohol or an ether, used as an additive to gasoline to improve octane rating or antiknock characteristics. ( 'āks-sē-jā, nār )

**oxygenated oil** [MATER] A class of essential oils containing